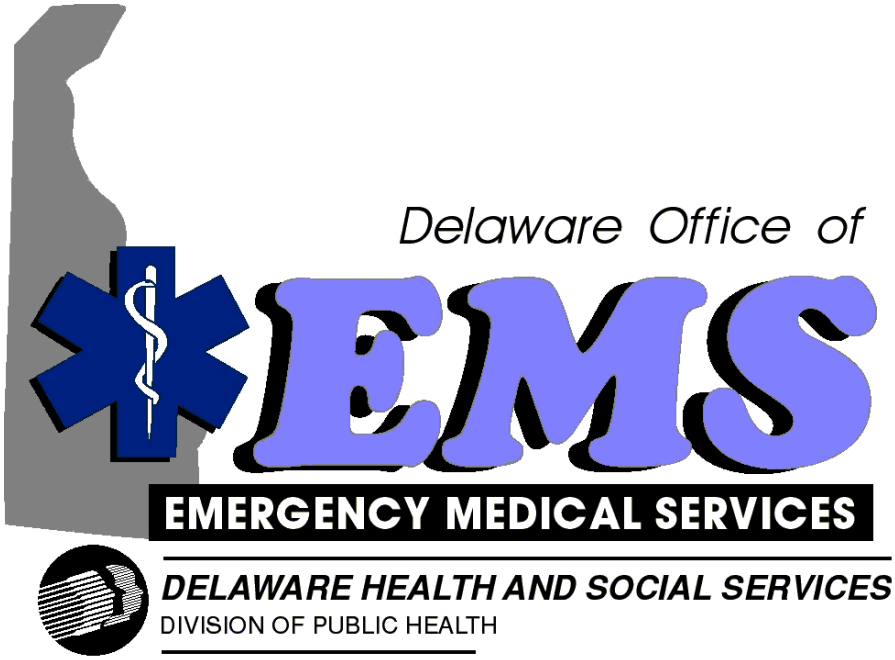
Statewide Standard Treatment Protocols

Paramedic Standing Orders and Policies

For

Toxmedic Program



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State of Delaware
Department of Health and Social Services
Division of Public Health
Office of Emergency Medical Services

2010 Statewide Standard Treatment Protocols for Delaware's Toxmedic Program

Karyl T. Rattay, MD.
Director
Division of Public Health

Ross E. Megargel, DO., FACEP.
State EMS Medical Director
Office of Emergency Medical Services

TOXMEDIC PROTOCOLS

PURPOSE:

- To delineate the requirements and responsibilities of the various agencies and individuals responsible for the Delaware Toxmedic program.

JUSTIFICATION:

- Patients who have been exposed to chemicals and weapons of mass destruction often require procedures, medications, and treatments that are not in the scope of a normal field paramedic.

ELIGIBILITY and RESPONSIBILITIES:

Agency Requirements:

- Participation in the Toxmedic program by Delaware paramedic agencies is elective.

- Each Delaware paramedic agency, which chooses to participate in the Toxmedic Program, will be required to apply for participation in the Toxmedic Program to the State Paramedic Administrator and State EMS Medical Director. Once granted participation by the State Paramedic Administrator and State EMS Medical Director training and credentialing of paramedics can begin.

- Each Delaware paramedic agency applying for inclusion in the Toxmedic Program will be an authorized emergency medical service provider in good standing with the Delaware Office of Emergency Medical Services.

- The paramedic agency will coordinate Delaware Toxmedic Program training with the Delaware Office of Emergency Medical Services Training Coordinator.

- Each agency will appoint a Toxmedic Coordinator that is a certified Toxmedic.

Toxmedic Requirements:

- Each Toxmedic must be currently certified as a Delaware paramedic.

- Each paramedic must be in good standing with his / her EMS agency's EMS medical director and the state EMS medical director.

- Each paramedic must demonstrate adequate experience and skill to his / her EMS agency's EMS medical director. They must then obtain a letter of recommendation for participation in the Toxmedic Program and forward it to the appropriate EMS agency administrator, state EMS Paramedic Administrator and the State EMS Medical Director.

- Each paramedic must successfully complete the Advanced Hazmat Life Support certification course

- Toxmedic members must maintain their certification through the successful completion of continuing education courses that meet requirements set by the Delaware Office of Emergency Medical Services Training Coordinator.

- Each paramedic must attend all designated Delaware Toxmedic Program training.

QUALITY IMPROVEMENT:

- The EMS agency's Quality Improvement Officer or Toxmedic Coordinator will be responsible for maintaining all appropriate documentation for the EMS agency's Toxmedic Program.

- The EMS agency's Quality Improvement Officer or Toxmedic Coordinator will be responsible for development and maintenance of a Toxmedic personnel and activity database.

- Annual review of Toxmedic clinical procedures will be performed by the agency Quality Improvement Manager or Toxmedic Coordinator, the agency EMS medical director to evaluate and improve procedures. An annual report will forwarded to the Paramedic Administrator and the State EMS Medical Director.

- The EMS agency's Quality Improvement Officer or Toxmedic Coordinator along with the EMS Medical Director will be responsible for making recommendations to the State Paramedic Administrator and State EMS Medical Director for modifications to training programs, standing orders, etc.

- The paramedic agency's EMS Medical Director shall review all situations involving utilization of skills normally approved by verbal medical control orders.

- All patients evaluated and treated by Toxmedics require the completion of a patient care report. In event of multiple casualties, the Toxmedic shall provide an operational overview of the medical situation.

GENERAL GUIDELINES:

- These protocols shall be in effect whenever the Toxmedic is involved with the treatment of patients contaminated with hazardous materials.

- The Statewide Toxmedic Protocols shall only apply to paramedics that have been designated by their agency's EMS medical director and / or state EMS medical director and who have completed all appropriate training, which are operating within a Delaware Office of Emergency Medical Services recognized Toxmedic Program.

- The expanded procedures included in this special protocol are only authorized for use by Delaware Certified Paramedics who are designated members of the Delaware Toxmedic Program by the State Paramedic Administrator and the State EMS Medical Director.

EQUIPMENT:

- Toxmedics may carry combinations of approved equipment in special packs as predetermined and authorized by the agency EMS medical director, that are designed for deployment in "Warm" zones.

- Below is a list of equipment that may be carried beyond the current approved State of Delaware, Statewide Treatment Protocols and Standing Paramedic Standing Orders

    - Tourniquet for control of severe hemorrhage

PROCEDURES and PROTOCOLS:

- In addition to the standard skills and procedures defined by the Paramedic Scope of Practice, Toxmedics are authorized to perform the following: Other procedures as approved by the Delaware EMS system medical direction through routine review and evaluation of this protocol (specifically in regards to knowledge of specific nuclear, biological or chemical terrorism threats).

TOXIDROMES

IRRITANT GAS TOXIDROMES: irritation, inflammation, edema, and even chemical burns of exposed mucous membranes, the airways, and even the lungs. Irritant gases include ammonia, chlorine, phosgene, etc.

ASPHYXIANT TOXIDROME: inadequate oxygen supply to the lungs, decreased oxygen transportation in the blood, and/or decreased ability of other tissues to use oxygen. The asphyxiant toxidrome is characterized by signs and symptoms in the cardiopulmonary and neurologic systems such as dyspnea, shortness of breath, chest pain, palpitations, dysrhythmias, syncope, seizures, coma, and even death. Can be caused by simple asphyxiants such as carbon dioxide or nitrogen; or caused by systemic asphyxiants such as carbon monoxide, cyanides, sulfides, or azides.

CHOLINERGIC TOXIDROME: characterized by **DUMBELS**: Diarrhea, Urination, Miosis, Bradycardia/Bronchorrhea/Bronchospasm, Emesis, Lacrimation, Salivation/Secretion/Sweating, and/or **MTWHF**: Miosis, Tachycardia, Weakness, Hypertension, and Fasciculations. Cholinesterase inhibitors, such as the organophosphates and the carbamates, cause the cholinergic toxidrome by producing excess acetylcholine.

CORROSIVE TOXIDROME: characterized by irritant and corrosive local toxic effects, resulting in chemical burns of the skin and mucous membranes that came in to contact with the corrosive. Examples of corrosives include acids, bases, oxidizers, and white phosphorus.

HYDROCARBON and HALOGENATED HYDROCARBON TOXIDROME: characterized by sleepiness, even to the point of narcosis, and cardiac irritability with PVCs, VT, VF. Examples of hydrocarbons include propane, gasoline, toluene, etc. Examples of halogenated hydrocarbons include chloroform and trichloroethylene (TCE).

SPECIFIC APPROVED PROTOCOLS

GENERAL PATIENT CARE - HAZMAT

INDICATIONS: Any patient requiring pre-hospital decontamination and medical treatment. The General Patient Care - Hazmat protocol will be followed in conjunction with all other applicable Delaware State protocols.

- Perform scene survey
- Observe universal precautions
- Consider required level of personal protection based on Hazmat Research and documented decontamination results.
- Assure rapid initiation of decontamination procedures.
- Decontamination solutions will be determined on research
- Consider the need for additional resources
- Determine responsiveness using AVPU
- Evaluate Airway, Breathing, Circulation, and Disability, Exposing the patient as needed
- Monitor airway constantly for signs of developing ARDS. Secure a patent airway appropriately
- Manage cervical spine appropriately
- Treat life-threatening conditions as necessary and appropriate per specific standing order.
- Assess for findings consistent with toxidromes and pre-existing conditions with potential for exacerbation, accompanying trauma, and/or burns
- Invoke the poisoning treatment paradigm:
  - Alter absorption
  - Antidote administration
  - Basics
  - Change catabolism
  - Distribute differently
  - Enhance elimination
- Administer oxygen as appropriate
- Assess body systems as appropriate
- Obtain medical history
- Evaluate vital signs (BP, pulses, RR & quality, tactile temp.) Reassess frequently as indicate by patient condition
- Monitor cardiac rhythm, apply 12-lead ECG as appropriate
- Assign treatment priority and make transport decision
- Establish intravenous access as appropriate
- Consider intraosseous access if IV access cannot be established for all patients requiring emergent fluid or antidote therapy. If IO access is obtained, all IV mediations can be administered IO.
- Contact medical control as soon as possible
- Transport patient to the nearest appropriate medical facility via appropriate mode of transportation without undue delay
- Transfer patient care to an appropriately trained health care provider

CYANIDE EXPOSURE

INDICATIONS:

Documented exposure to cyanide product(s) with signs and symptoms consistent with hypoxia/hypoxemia, including; tachypnea, tachycardia, headache, AMS, ECG indicative of myocardial ischemia/infarct, nausea, vomiting, seizure, and coma.

- Assure proper patient decontamination has been performed prior to patient contact.
- Take precautions against secondary contamination from body fluids and off gassing from GI tract.
- Assure adequate airway, ventilation, and oxygenation. Secure airway early, especially if secretions require suctioning. Consider administration of Etomidate (0.2-0.6 mg/kg IVP) if sedation prior to intubation is indicated or initiate RSI if available.
- Monitor cardiac rhythm and perform 12 ECG as appropriate.
- Establish two large bore IV accesses.
- Establish a complete set of vital signs. Repeat VS assessment q. 3-5 minutes.
- If available, perform Point of Care (POC) serum lactate testing
  - Lactate $\geq$ 10 mmol/l in the absence of severe burns or hypotension may suggest cyanide toxicity
- Assure receiving facility has proper notifications as soon as possible.
- Treat cardiac changes and seizures per paramedic standing orders.

MEDICATIONS (Cyanide Antidote Kit):

- Prior to IV access initiate Amyl Nitrite inhalation. Allow inhalation from ampule for 30 seconds of each minute. Ampules should be changed every 3 minutes. Deliver via assisted ventilations if necessary.
- As soon as IV access is accomplished administer Sodium Nitrite (1 amp IV over no less than 5 minutes). Sodium Nitrite may be diluted in 50-100 ml NSS and titrated to avoid hypotension.
- Administer Sodium Thiosulfate (1 amp IV over 10-20 minutes). Sodium thiosulfate may be diluted in 50-100 ml NSS and titrated to avoid hypotension

MEDICATIONS (Hydroxocobalamin - Cyanokit®):

- Prior to administering hydroxocobalamin:
  - Determine blood glucose level
  - Draw venous blood sample if possible
  - Calculate burn percent body surface area involved
- Administer 5 grams (2 vials) hydroxocobalamin IV infusion over at least 15 minutes.
  - Hydroxocobalamin is available in a 250 ml glass vial containing 2.5 g of lyophilized hydroxocobalamin.
  - Reconstitute with 100 ml of normal saline.

    - Following addition of diluent, each vial should be repeatedly inverted for 30 seconds to thoroughly mix the solution – do not shake.
    - Visually inspect the solution prior to administration. If the solution is not dark red or if particulate matter is seen, do not administer the solution.)
    - Monitor the patient's blood pressure closely for hypertensive effects.
- If patient condition stabilizes but minor symptoms persist, consider administration of Sodium Thiosulfate (1 amp over 10 – 20 minutes). Sodium Thiosulfate may be diluted in 50 – 100 ml NSS and titrated to avoid hypotension.
    - Sodium Thiosulfate is not compatible with hydroxocobalamin and the two should not be given in the same IV line
    - If a second IV line cannot be established, Sodium Thiosulfate may be administered only after flushing the hydroxocobalamin line with 20 ml of NSS
- A second dose, 5 grams of hydroxocobalamin may be administered when the exposure is severe or the patient's clinical response to the first dose is inadequate.
    - The solution is prepared as noted above.
    - The rate of administration may range from 15 minutes (for patients in extremis) to 2 hours.

Note: Hydroxocobalamin may also be considered for use in smoke inhalation patients who remain unresponsive following adequate oxygenation. Rule out other common causes of altered mental status (i.e. hypoglycemia, narcotic overdose) prior to administration of hydroxocobalamin.

Sodium Thiosulfate is an optional medication that may not be available based on the kit chosen by the agency.

CHOLINESTERASE INHIBITOR EXPOSURE

INDICATIONS:

Documented exposure to Cholinesterase Inhibitor with signs and symptoms of the Cholinergic Toxidrome.

- Assure proper patient decontamination has been performed prior to patient contact.
- Take precautions against secondary contamination from body fluids and off gassing from GI tract.
- Assure adequate airway, ventilation, and oxygenation. Secure airway early, especially if secretions require suctioning. Consider administration of Etomidate (0.2-0.6 mg/kg IVP) if sedation prior to intubation is indicated or initiate RSI if available.
- Monitor cardiac rhythm and perform 12 ECG as appropriate.
- Establish two large bore IV accesses.
- Establish a complete set of vital signs. Repeat VS assessment q. 3-5 minutes.
- Assure receiving facility has proper notifications as soon as possible.
- Treat cardiac changes per paramedic standing orders.

MEDICATIONS:

- Administer Atropine 2mg IV every 5 minutes until bronchorrhea, bronchospasm, and bradycardia resolve. Atropine may be given IM via autoinjector if situation prevents IV access attempts.
- Administer Pralidoxime (2-PAM) 1-2 grams over 5-10 minutes. Pralidoxime may be given IM via autoinjector if situation prevents IV access attempts.
- If the patient is exhibiting seizure activity, administer 10 mg Valium IM via autoinjector (preferred if available) or per paramedic standing orders.

HYDROFLUORIC ACID EXPOSURE

INDICATIONS:

Documented exposure to hydrofluoric acid with signs and symptoms of the corrosive toxidrome. With patients exposed to less then 50% hydrofluoric acid their symptoms may be delayed up to 24 hours. Pain will be out of proportion compared to the physical findings at the burn site.

- Assure proper patient decontamination has been performed prior to patient contact.
- Take precautions against secondary contamination.
- Assure adequate airway, ventilation, and oxygenation. If airway injury is present then rapidly initiate RSI if available.
- Monitor cardiac rhythm and perform 12 ECG as appropriate.
- Assure receiving facility has proper notifications as soon as possible.
- Treat cardiac changes and seizures per paramedic standing orders.

MEDICATIONS:

- For skin burns apply topical calcium gluconate gel after copious skin irrigation.
- Consider subcutaneous injection of calcium gluconate .5ml per cm^2 titrated to pain relief.
- Consider IV calcium gluconate 10 – 30mls titrated to control cardiac dysrhythmias.

SULFIDE EXPOSURE

INDICATIONS:

Documented exposure to sulfide (hydrogen sulfide, potassium sulfide or sodium sulfide) with signs and symptoms consistent with hypoxia/hypoxemia, including; tachypnea, tachycardia, arrhythmias, headache, AMS, ECG indicative of myocardial ischemia/infarct, nausea, vomiting, seizure, and coma.

- Assure proper patient decontamination has been performed prior to patient contact.
- Take precautions against secondary contamination from body fluids and off gassing from GI tract.
- Assure adequate airway, ventilation, and oxygenation. Secure airway early, especially if secretions require suctioning. Consider administration of Etomidate (0.2-0.6 mg/kg IVP) if sedation prior to intubation is indicated or initiate RSI if available.
- Monitor cardiac rhythm and perform 12 ECG as appropriate.
- Establish two large bore IV accesses.
- Establish a complete set of vital signs. Repeat VS assessment q. 3-5 minutes.
- Assure receiving facility has proper notifications as soon as possible.
- Treat cardiac changes and seizures per paramedic standing orders.

MEDICATIONS (Cyanide Antidote Kit):

- Prior to IV access initiate Amyl nitrite inhalation. Allow inhalation from ampule for 30 seconds of each minute. Ampules should be changed every 3 minutes. Deliver via assisted ventilations if necessary.
- As soon as IV access is accomplished administer sodium nitrite (1 amp IV over no less than 5 minutes). Sodium nitrite may be diluted in 50-100 ml NSS and titrated to avoid hypotension.
- If symptoms persist after 20 minutes, repeat sodium nitrite (1/2 amp IV over no less than 5 minutes)
- If symptoms worsen after treatment, consider nitrite toxicity causing excessive methemoglobinemia – contact medical control

Sodium thiosulfate is not effective for sulfide exposure

Amyl nitrite and sodium nitrite are an optional medications that may not be available based on the kit chosen by the agency.